Centre No.			Paper Reference							Surname	Initial(s)
Candidate No.			6	1	3	1	/	0	1	Signature	

Paner Reference(s)

6131/01 Edexcel GCE Biology (Salters-Nuffield) Advanced Subsidiary

Unit Test 1

Thursday 8 January 2009 - Morning

Time: 1 hour 15 minutes

Materials required for examination	Items included with question papers
Nil	Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature. The paper reference is shown above. Check that you have the correct question paper. Answer ALL questions. Write your answers in the spaces provided in this question paper. If you need to use additional answer sheets, attach them loosely but securely inside this booklet. Show all the steps in any calculations and state the units. Calculators may be used. Include diagrams in your answers where these are helpful.

Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. (2). There are 7 questions in this question paper. The total mark for this paper is 60. There are 20 pages in this question paper. Any blank pages are indicated.

Advice to Candidates

You will be assessed on your ability to organise and present information, ideas, descriptions and arguments clearly and logically, including your use of grammar, punctuation and spelling.

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Turn over

Total

Examiner's use only

Team Leader's use only

Question Number

1

2

3

4

5

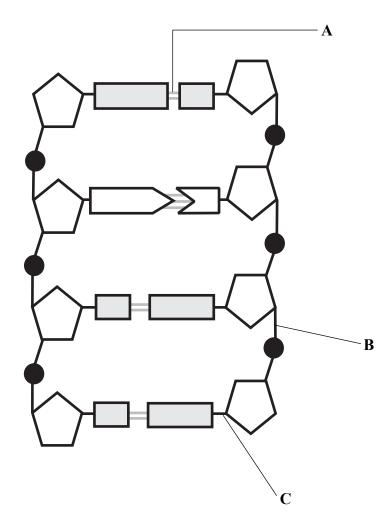
6



Leave blank

Answer ALL questions in the spaces provided.

1. The diagram below shows a section of human DNA.



(a) Draw a circle around **one** nucleotide on the diagram above.

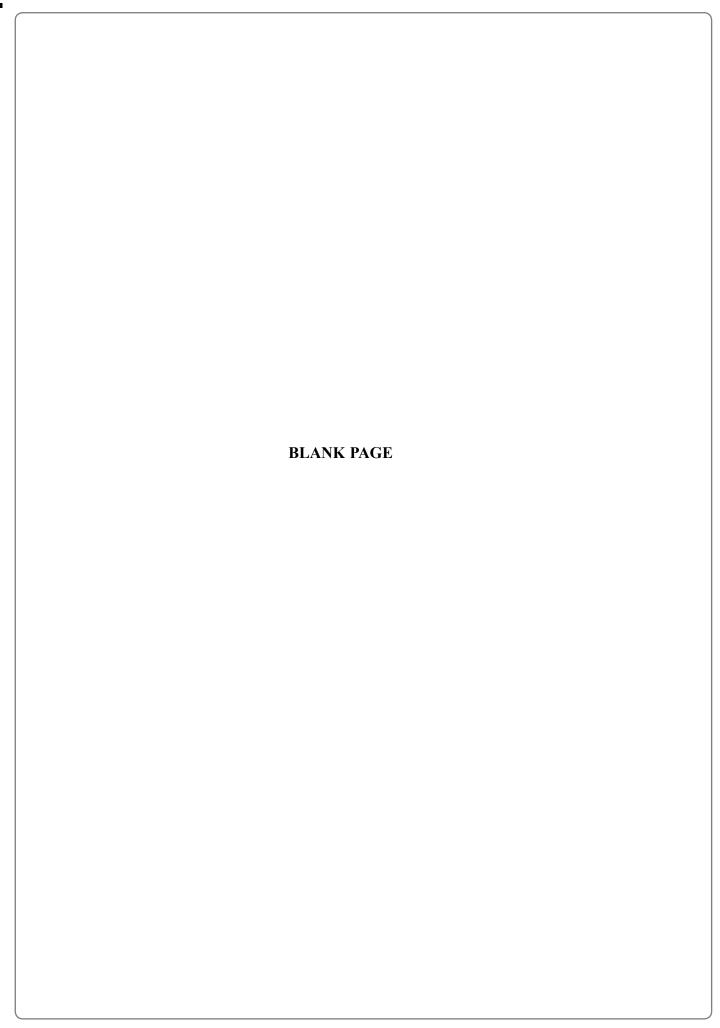
(1)

(b) The letters A, B and C represent bonds.

(i) Name the type of bond labelled **A**.

(1)

The table below shows the percentage of thymine found in a sample of human DNA. Complete the table by adding the names of the three missing bases and their percentages. Base Percentage found in a sample of human DNA Thymine 36 Total			(1
The table below shows the percentage of thymine found in a sample of human DNA. Complete the table by adding the names of the three missing bases and their percentages. Base	Name two components	s of DNA, other than the bases.	
The table below shows the percentage of thymine found in a sample of human DNA. Complete the table by adding the names of the three missing bases and their percentages. Base	1		
The table below shows the percentage of thymine found in a sample of human DNA. Complete the table by adding the names of the three missing bases and their percentages. Base	2		
DNA. Complete the table by adding the names of the three missing bases and their percentages. Base			(2
Thymine 36 Total 100	DNA. Complete the ta	ws the percentage of thymine found in a sample of able by adding the names of the three missing bases a	humai nd thei
Total 100	Base		
(2	Thymine	36	
(2			
(2			
(2			
	Total	100	
(Total 7 marks			(2
		(Total 7	marks)

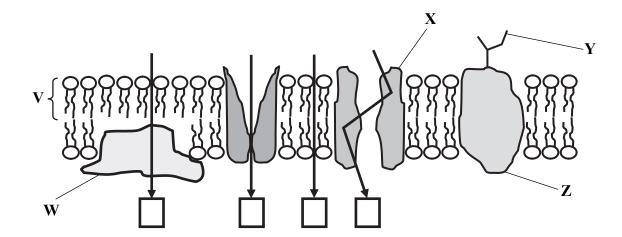


2. Oxygen is absorbed across the gas exchange surface of the lungs and enters the bloodstream.

(a) Name the site of gas exchange in the lungs.



(b) The gas exchange surface of the lungs consists of cells. The diagram below shows the fluid mosaic model of the surface membrane from one of these cells.



(i) Place a tick 🗸 in the box below the arrow on the diagram that represents the main way oxygen diffuses into the cell.

(1)

(ii) Name the structure labelled \mathbf{Y} on the diagram.

(1)

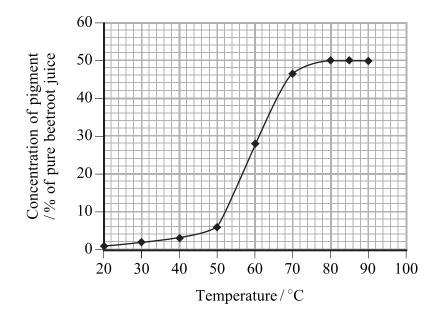
(iii) Give the letter of the component that represents the fluid part of the fluid mosaic model.

(1)

(c) A student used raw beetroot to investigate the effect of temperature on membrane structure.

He cut nine equal-sized pieces of beetroot and washed them to remove any purple-red pigment released during the cutting process. He placed one beetroot piece in a test tube with 10 cm^3 water at $20 \,^{\circ}\text{C}$. After 5 minutes, he removed the beetroot piece. He measured the concentration of pigment in the water as a percentage of pure beetroot juice.

The procedure was repeated with the other beetroot pieces at eight different temperatures. The results are shown in the graph below.



<i>(</i> ''')	(5
(ii)	(5
(ii)	Suggest why the concentration of pigment levelled out at 50% of the original
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(ii)	Suggest why the concentration of pigment levelled out at 50% of the original
(ii)	Suggest why the concentration of pigment levelled out at 50% of the original pigment concentration after 80 °C.
(ii)	Suggest why the concentration of pigment levelled out at 50% of the original pigment concentration after 80 °C. (2) (Total 11 marks)

3.	(a)	In the	space	below,	draw	a tr	riglyceride.	You	may	use	any	component	more	than
		once.												

fatty acid ester bond glycerol

(3)

(b) There are four statements about triglycerides given below. If the statement is correct put a tick (✓) in the box to the right of that statement and if the statement is incorrect put a cross (✗) in the box.

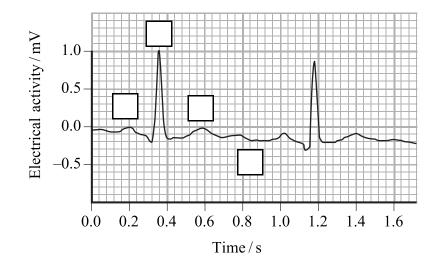
Statement	Tick (✓) or cross (×)
Triglycerides are building blocks of polysaccharides	
Triglycerides can contain a small amount of nitrogen	
Triglycerides can be modified into phospholipids	
Triglycerides release water during hydrolysis	

(4)

(c)	Fatty acids can be either saturated or unsaturated. Explain what is meant by the term saturated fatty acid.	Leave blank
	(1)	Q3
	(Total 8 marks)	

Leave blank

4. (a) The electrocardiogram (ECG) below shows the normal electrical activity of the heart measured at the body surface.



(i) Place a tick (\checkmark) in the box on the ECG that shows electrical activity of the sino-atrial node (SAN).

(1)

(ii) Use the ECG above to calculate the heart rate in beats per minute. Show your working.

Answer: beats per minute

(2)

(iii) Suggest a likely difference in the ECG shown above if the person being tested had recently had a caffeine-rich drink.

.....

(1)

10

In embolisation, an inert substance is injected into an artery that supplies blood to a tumour. The substance fully blocks that artery. Suggest how embolisation helps to destroy a tumour. (2) (Total 6 marks)	(b)	Blockage of a coronary vessel can lead to the death of the cardiac muscle cells. This knowledge has been applied in a medical technique called embolisation that can be used for the treatment of tumours (uncontrolled growths of cells).
(2)		
		Suggest how embolisation helps to destroy a tumour.
(Total 6 marks)		

a) Explain the	e term carrier .				
•••••					
					(2)
b) The pedig	ree diagram below	shows the inher	ritance of R-tha	lassaemia over th	
	s of a family.	shows the filler	itance of p-tha		iicc
				Unaffected female	
	$A \longrightarrow B$			Female with	
				β-thalassaemia	ì
C	\mathbf{D} \mathbf{E}	F	$\overline{\mathbf{G}}$	Unaffected ma	ıle
				Male with β-thalassaemia	ì
(i) Haina	the mediance discrem	n state the numb	or of formale abi	ldran agunla A an	a D
(i) Using had.	the pedigree diagran	n, state the numb	er of female chi	ndren couple A and	и В
					(1)
(ii) By me	eans of a genetic diag	gram, explain wh	ny child D has β	-thalassaemia.	

	(2)
bo the	ne National Health Service (NHS) provides genetic counselling to couples where the partners are carriers of β-thalassaemia and are thinking of trying for a baby. If the woman becomes pregnant, the NHS will offer chorionic villus sampling (CVS) to ow the couple to make an informed choice about the pregnancy.
(i)	The counsellor will tell the couple the probability that their child will have β -thalassaemia. State this probability.
	(1)
(ii	(1)) Discuss the issues that these carrier couples might consider when deciding whether or not to have CVS.
(ii) Discuss the issues that these carrier couples might consider when deciding
(ii) Discuss the issues that these carrier couples might consider when deciding
(ii) Discuss the issues that these carrier couples might consider when deciding
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(ii	Discuss the issues that these carrier couples might consider when deciding whether or not to have CVS.
(ii	Discuss the issues that these carrier couples might consider when deciding whether or not to have CVS.

6.	(a)	Cystic fibrosis is a recessive inherited condition that can affect the functioning of the reproductive system. Describe the effect of cystic fibrosis on the male reproductive system.
		(3)

(b) Two DNA template sequences are given below, along with a number reference. Sequence P comes from a person without cystic fibrosis and sequence Q comes from a person with cystic fibrosis. **T represents a deleted thymine base.

Number reference	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Sequence P (unaffected)	A	T	С	A	Т	C	Т	Т	T	G	G	T	G	T	Τ
Sequence Q (cystic fibrosis)	A	Т	С	A	Т	T,	7	7	7	G	Т	Т	G	Т	Т

	(T) bases in sequence Q, as shown by X X X. State two other differences between sequence P and sequence Q.
	1
	2
	(1)
(ii)	In gel electrophoresis, a gene probe would be used to detect the presence of sequence Q. Give the DNA sequence of the gene probe suitable for detecting sequence Q.
	(1)
	(Total 5 marks)

7. The table below gives details of the nutritional composition of a low fat yoghurt and a high fat yoghurt. Both yoghurts had the same mass.

Nuduitional common and	Yoghurt type		
Nutritional component	Low fat	High fat	
Lactose / g	16.0	11.0	
Protein / g	12.0	8.0	
Cholesterol / mg	14.0	29.0	
Total fat / g	4.0	7.0	

(a)	Name the two monomers that make up the disaccharide named in the table.
	1
	2(2)
(b)	Use the table to compare the nutritional components of low fat and high fat yoghurt with respect to cardiovascular disease (CVD).
	(5)

END		
(Total 12 marks) TOTAL FOR PAPER: 60 MARKS		
(1)	Q7	
(ii) Name the site within a cell where stage 3 occurs.		
 (i) At each stage, one or more nucleic acids is involved. Give the nucleic acid or nucleic acids involved at each stage on the dotted line next to the box. The first one has been done for you. 		
Stage 3 Translation into casein protein		
Transcription of template that codes for casein occurs in the nucleus		
Stage 2		
Stage 1 Double helix is unzipped, exposing template that codes for casein		

